

## **REMARKS**

In the Office Action dated September 5, 2006, claims 1-16 were rejected under 35 U.S.C. §101 as being directed to non-statutory subject matter, because the Examiner stated the abstract idea of classifying plaque is not practically applied. The Examiner suggested amending claim 1 to include a step that describes activity that is done following plaque classification, however, Applicants do not believe such a detailed amendment of claim 1 is necessary in order to comply with the Interim Guidelines for patent subject matter eligibility cited by the Examiner. Instead, in addition to the other changes in claim 1, claim 1 has been amended to state that the result of the classification is presented in a visually perceptible display at the computer in which the classification is undertaken. Such an output in the form of a displayed image is a "tangible result" that conforms to the aforementioned guidelines. Claims 1-16 are therefore submitted to conform to the requirements for statutory subject matter under 35 U.S.C. §101.

Claim 33 was rejected under §112, second paragraph as being indefinite because the Examiner stated the phrase "said computer" is indefinite due to the citation of multiple computers in the parent claim. Claim 33 has been amended to make clear that the computer described therein is the system computer, which has antecedent basis in claim 1. A typographical error in claim 33 also has been corrected.

Claims 1, 3-5, 7, 15 and 16 were rejected under 35 U.S.C. §102(b) as being anticipated by Prince. Claims 2 and 9-14 were rejected under 35 U.S.C. §103(a) as being unpatentable over Prince in view of Cai. Claims 17-33 were rejected under 35 U.S.C. §103(a) as being unpatentable over Prince in view of Clarke.

These rejections are respectfully traversed for the following reasons.

In substantiating the rejection of independent claim 1 as being anticipated by the Prince reference, the Examiner stated that the Prince reference discloses obtaining a baseline MR image and thereafter injecting a contrast agent into the subject, and obtaining several contrast-enhanced MR images following the injection. The Examiner stated the MR scanner disclosed in the Prince reference is inherently capable of collecting data by FLASH sequences, and the Examiner stated that the Prince reference discloses determining an intensity distribution over time from the images of the selected region, citing Figure 9 of the Prince reference.

Independent claim 1 as originally filed, as well as independent claim 17, specifically referred to obtaining an intensity distribution of a *cross-section* of a vessel containing plaque. Applicants submit there is no disclosure or suggestion in the Prince reference of obtaining such a cross-section image of a vessel containing plaque, and then using that image, in conjunction with other cross-section images of the vessel containing plaque, to determine respective intensity distributions from which a classification of the plaque is then made.

The Prince reference discloses the use of contrast agent to generate conventional angiographic images of blood vessels. Such angiographic images are *not* cross-sectional images, but are simply contrast-enhanced images of the blood vessels themselves. Although these images are used to evaluate or diagnose different types of pathologies, that can include atherosclerosis, such evaluation is undertaken simply by determining an intensity distribution of the contrast-enhanced angiographic images themselves, and there is no disclosure or suggestion of the contrast agent interacting with the plaque in the vessels, nor is there any suggestion

or disclosure in the Prince reference to determine an intensity distribution of a *cross-section* of a vessel containing plaque.

As described at column 5, beginning at line 15, the method and apparatus disclosed in the Prince reference can also be used to characterize or evaluate aneurisms in the abdomen. For this purpose, a number of magnetic resonance angiography sequences are used that include a spin echo sequence and four contrast agent-enhanced magnetic resonance angiography sequences. As further stated at column 5, beginning at line 62 of the Prince reference, a combination of contrast agent-enhanced magnetic resonance angiography sequences is used in order to provide a mechanism that is as precise as possible for detection, examination and “grading” occlusive lesions. Beyond this general statement, however, there is no disclosure in the Prince reference as to any technique for classifying, or even detecting, plaque tissue itself. All of the evaluations that take place in the Prince system and method proceed from the basis of the angiographic images. The disclosure of the Prince reference is limited to the representation of blood vessels with and without contrast agent enhancement, and making conclusions from those types of images.

The Examiner referred to Figure 9 as disclosing the determination of an intensity distribution over time. In the text explanation associated with Figure 9, the Prince reference merely states that there are short time spans in which the signal intensity from the aorta is larger than the signal intensity from IVC, background tissue, fat and muscles. In other words, the Prince reference merely determines a signal intensity of the individual anatomical features over time. There is no discussion in connection with Figure 9 of the Prince reference, or at any other

location in the Prince reference, regarding undertaking a further processing of any individual images in this time series for any purpose, much less for the purpose of categorizing plaque.

Consistent with the above discussion, claim 1 has been amended to make clear that the aforementioned cross-section not only shows the vessel, but also the plaque therein, and that the cross-section is obtained transverse to the direction of blood flow in the vessel in question. Corresponding amendments have been made in independent claim 17.

For the above reasons, therefore, the Prince reference does not disclose all of the method steps of claim 1 as arranged and operating in that claim, and therefore does not anticipate claim 1 or any of claims 3-5, 7, 15 or 16 depending therefrom.

In view of the aforementioned lack of disclosure in the Prince reference, modification of the teachings of that reference in accordance with the teachings of the Cai reference still would not result in method steps comparable to those set forth in claims 2 and 9-14, each of which embodies the subject matter of claim 1 therein. None of claims 2 or 9-14, therefore, would have been obvious to a person of ordinary skill in the field of magnetic resonance imaging under the provisions of 35 U.S.C. §103(a) based on the teachings of Prince and Cai.

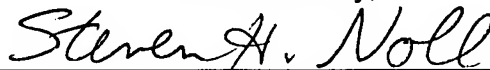
The same factors discussed above with regard to the rejection of claim 1 apply to the rejection of independent claim 17 based on the teachings of Prince and Clarke. The Clarke reference describes a method for identification of plaque in which a cluster analysis of multi-spectral MR images is implemented. In contrast to claim 17, however, there is no disclosure in the Clarke reference of a temporal correlation between the individual multi-spectral MR images. Therefore, Applicants

fail to see how a modification of the Prince reference in accordance with the teachings of Clarke would result in the subject matter of claim 17, particularly in view of the aforementioned lack of teachings in the Prince reference. None of claim 17-33, therefore, would have been obvious to a person of ordinary skill in the field of magnetic resonance imaging, based on the teachings of Prince and Clarke.

Moreover, since the Prince reference discloses obtaining standard angiography images by the use of contrast agent, there is no teaching in that reference to select time durations for obtaining the respective images dependent on the interaction of the plaque with the contrast agent, as set forth in claims 3 and 5 and claims 19 and 21. Moreover, there is no teaching in the Prince reference that would allow any conclusion whatsoever to be drawn regarding the propensity of the plaque to dislodge from the vessel, as set forth in dependent claims 2 and 18.

All claims of the application are therefore submitted to be in condition for allowance, and early reconsideration of the application is respectfully requested.

Submitted by,



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